Characteristics of Good Performance Metrics for Performance Based Logistics

Ken Doerr, Don Eaton & Ira Lewis
Graduate School of Business and Public Policy
Naval Postgraduate School

Project Background

- OSD mandate to services to use Performance-Based Logistics (PBL) in supporting weapon systems
- Ultimate goal is a model that will evaluate the key metrics and incentives associated with PBL projects
- Our research is a stepping stone in that direction.

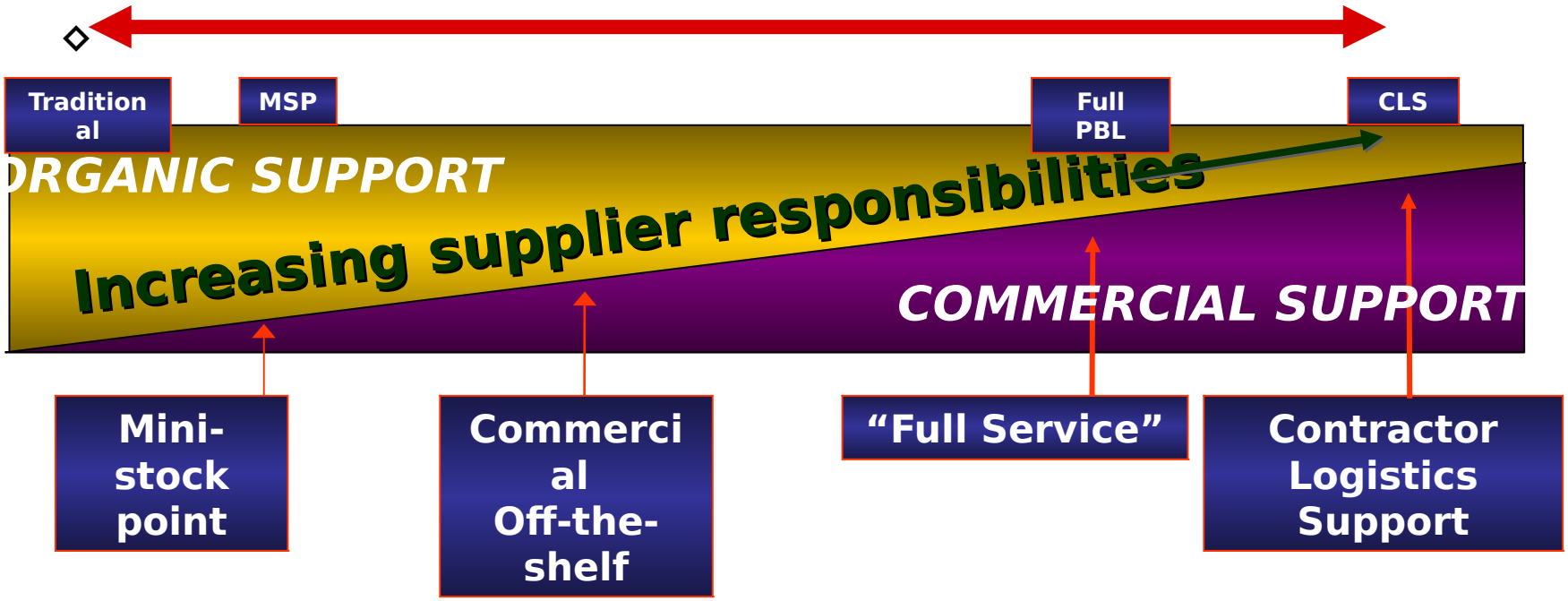
Research Questions

- What are some of the major factors to consider when implementing PBL?
- What are the critical metrics that should be employed to evaluate the implementation of PBL efforts?
- To what degree are key performance indications overlooked in the absence of clear metrics?
- To what degree are key performance indications overlooked in the presence of a large number of unrelated measures?

Performance Based Service Agreements and Performance Based Logistics

- Performance Based Service Agreements
  - Objectives of outsourcing services
  - Difficulty of measuring service performance
  - Operational risk shared with vendor
  - Financial risk reduced in exchange
- PBL
  - Objectives: lifecycle cost reduction, readiness improvement, footprint reduction
  - Not necessarily outsourced, but metric issues may be different when outsourced
  - Importance of metrics to outsourced processes – managing outside the black box
  - Importance of maintaining a capability to outsource

PBL Support Spectrum



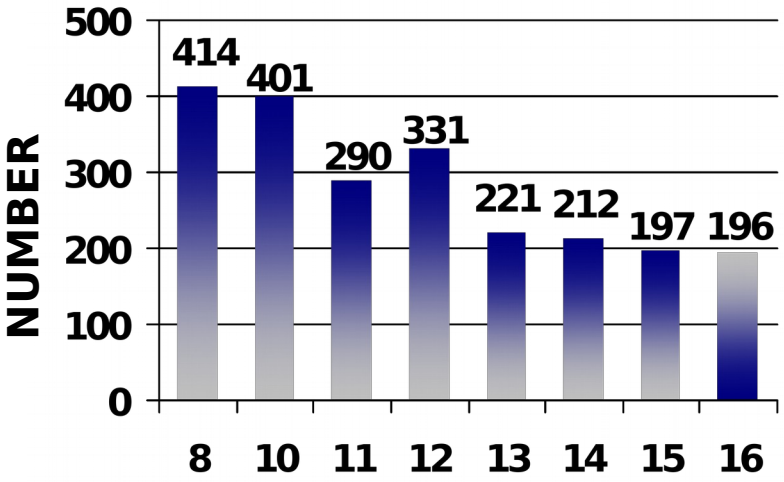
Measurement Theory – underlying principles of good metrics

- Sensitivity, Reliability and Validity

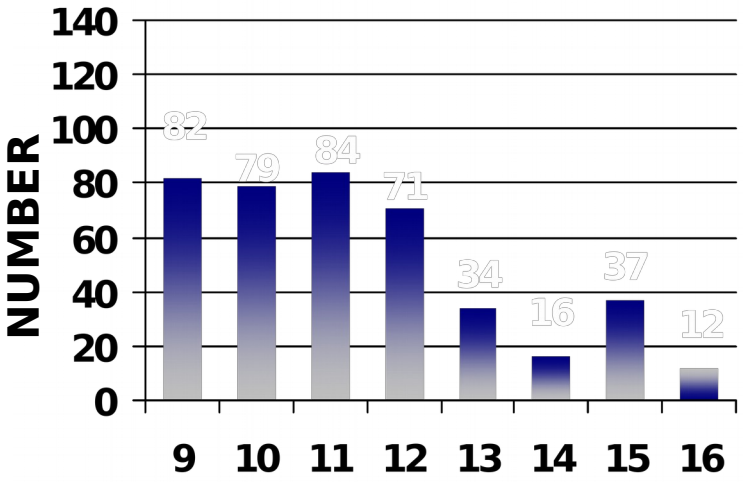
- Measuring unobservable variables: construct validity

Changes In Key Performance Indicators

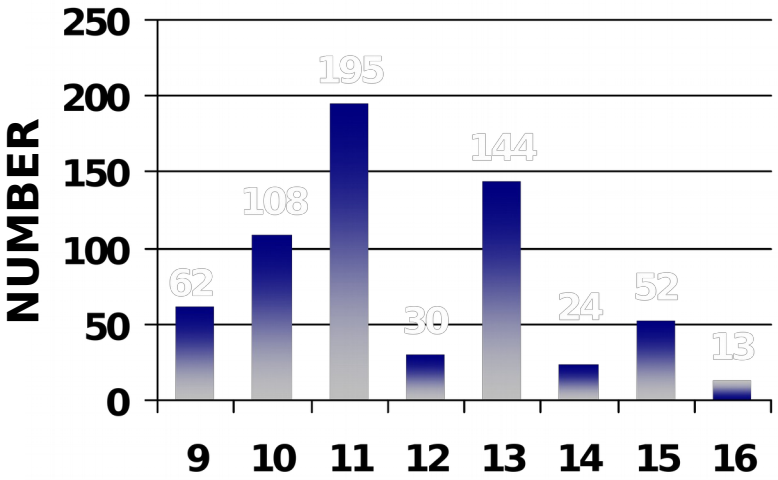
Total Metrics



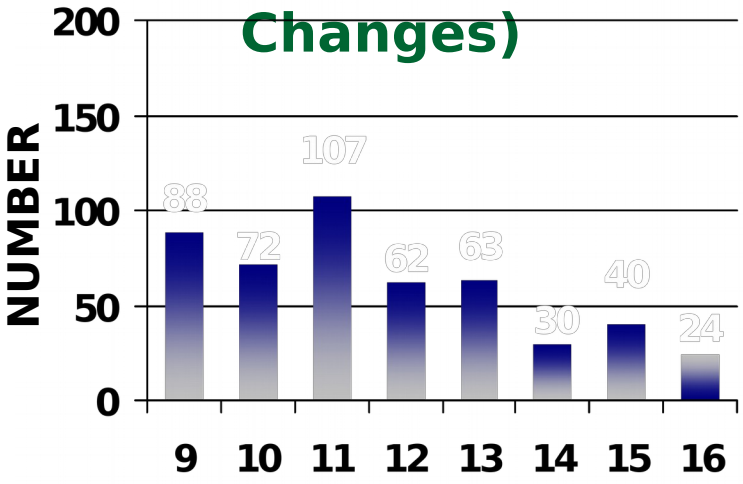
Metrics Added



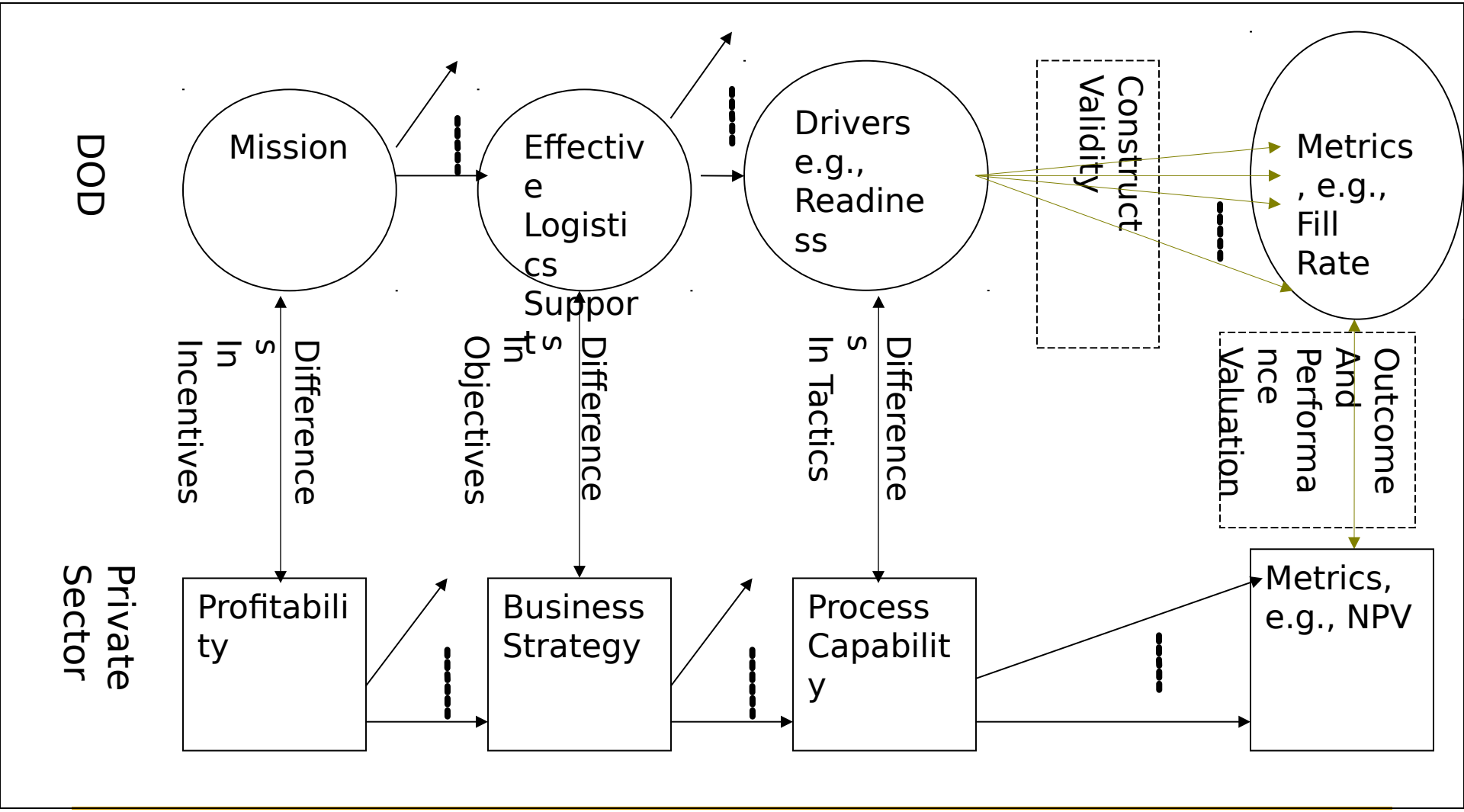
Metrics Deleted



Metrics Revised (Goal Changes)



Measurement issues in outsourcing logistical support of weapon systems



Reliability & Risk

- Reliability as a core driver of PBL objectives
  - Cost
  - Readiness
  - Footprint
- Risk assessment as a necessary condition
  - Operational risk – implications to readiness
  - Average case analysis not sufficient

Experiment

- Protocol: participants presented a hypothetical scenario & asked to evaluate of performance data
- Manipulation involves
  - presence of risk / reliability information
  - volume & scope of metrics
- Hypotheses: impact of reliability & risk measurement on assessment of logistical support effectiveness
  - To what extent does measuring A cause you to overlook B
  - Halo effect – to what extent are (unrelated) judgments of effectiveness of component support carried over to judgments of weapon system support

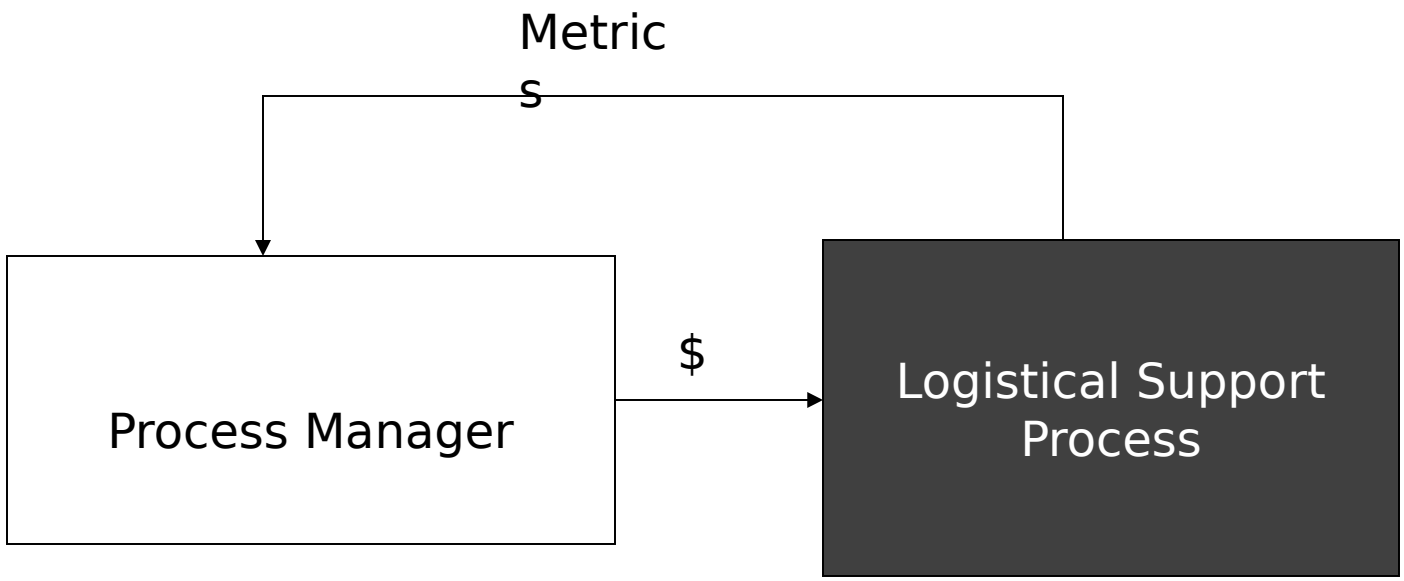
Summary

- What constitutes good measurement is well understood, but the application of that understanding to PBL management is an open question
- Diversity in PBL contracts, including ‘spectrum’, makes generic recommendation on measurement difficult
- Mosaic of issues needing investigation, reliability and risk are starting tiles

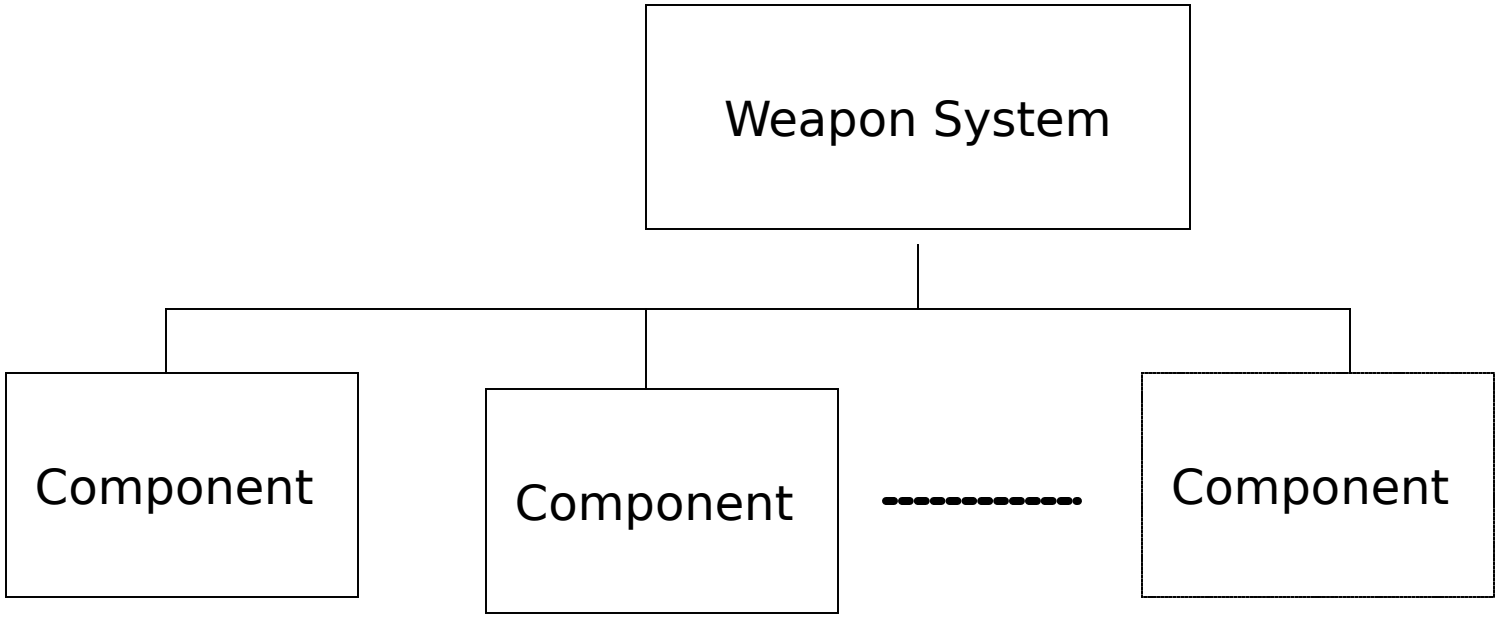
Literature

- Outsourcing & vertical disintegration
- Service quality
- Logistics performance measurement
- Service Level Agreements

Control theory – logistical support as a black box



Component Measurement and Theory of Constraints



Risk and availability

Day	#aircraft mc	#aircraft mc
1	10	10
2	10	9
3	10	10
4	10	9
5	10	10
6	10	9
7	10	10
8	10	9
9	10	10
10	10	9
11	10	10
12	0	9
13	10	10
14	10	9
15	10	10
16	10	9
17	10	10
18	10	9
19	10	10
20	10	9